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(71) Applicant
Frank Boram
c/o Projectron Limited, Queensway,
Stem Lane Industrial Estate, New Milton, Hampshire

(72) Inventor
Frank Boram

(74) Agent and/or Address for Service
Mathisen Macara & Co
The Coach House, 6/8 Swakeleys Road, Ickenham,
Uxbridge, Middlesex, UB10 8BZ

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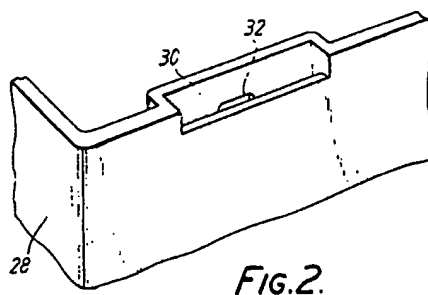
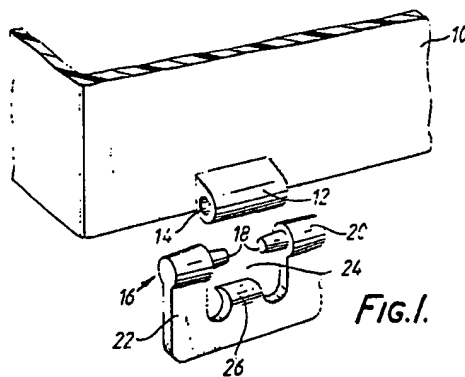
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E2F
Selected US specifications from IPC sub-class
E05D

(54) Hinges

(57) A plastics hinge assembly comprises means (12) defining at least one recess (14) integral with or securable to one item (10) to be hinged to another item (28) and means defining at least one member (18) complementary to the or each recess so that the inter-engagement of the or each recess and the or each member will provide the required hinge action, at least one of the defining means being integral with a plate-like portion (22) thereof incorporating at least one resilient detent (26), the plate-like portion being arranged to engage in a slot (30) of the corresponding said item and to be retained therein by engagement of the detent in a corresponding recess or aperture (32) in the wall of the slot.

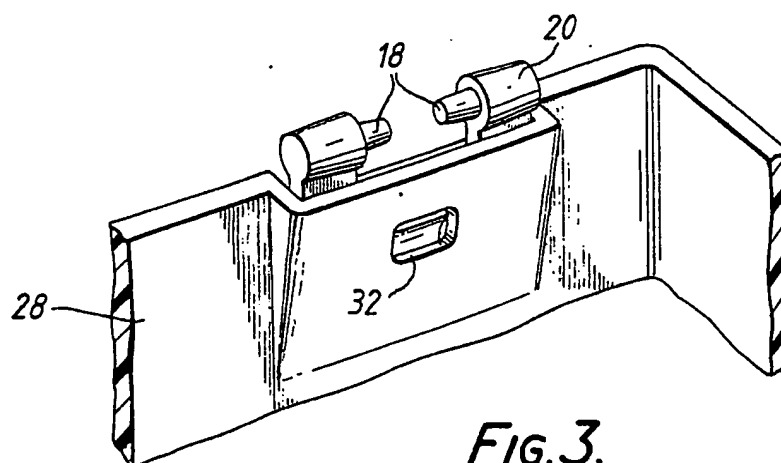
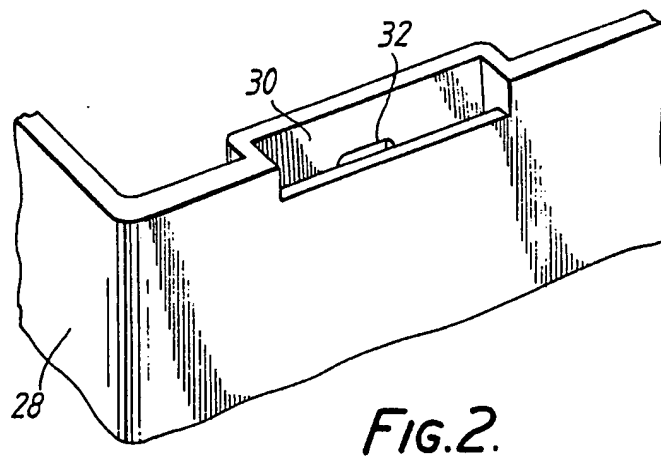
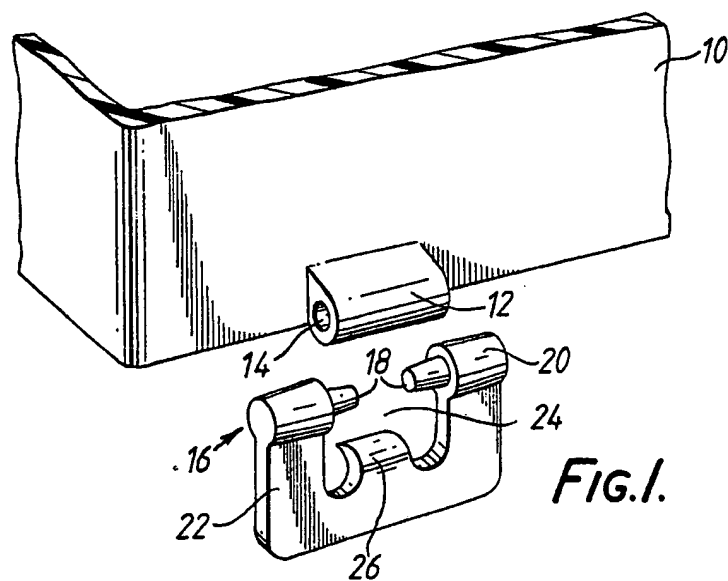


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The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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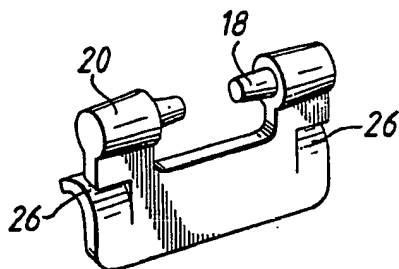


FIG. 4.

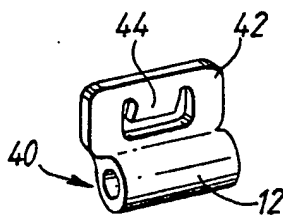


FIG. 5.

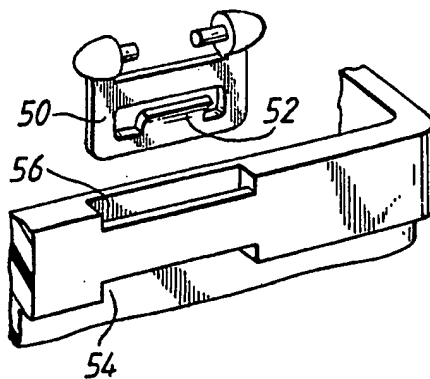


FIG. 6.

HINGES

This invention relates to hinges, for example for inter-connecting box bodies to box lids made of plastics material.

The manufacture of plastics boxes and containers of all kinds has become commonplace, particularly where mass produced quantities are required with consequent lowest possible cost.

Hitherto, some boxes or other containers have been manufactured with parts of the hinged moulded integrally with the main parts of the box and subsequently a pin has been threaded through the apertures but, in many cases although the box parts have been of plastics, the hinges themselves have continued to be made of metal. Such metal hinges have the initial disadvantage that they represent an unduly high cost in relation to the overall cost of the box or other container and furthermore, unless special materials are made or the plating of sheet materials is of adequate standard, corrosion will result if the storage conditions are damp. Obviously, this has the shorter term disadvantage of an unsightly container at the point of sale and the longer term disadvantage that the hinge may

fail completely. However, it is primarily the cost aspect which represents a severe disadvantage to the metal hinge since on the basis of present costs a metal hinge represents approximately five times the expenditure of an all plastics hinge.

Since most plastics boxes and containers are moulded it follows that ideally all of the hinge components themselves will also be moulded integrally with the box or container components, but this is not practicable in most instances owing to the complex shapes of the mould and corresponding difficulties with de-moulding of such complex shapes.

According to the present invention there is provided a plastics hinge assembly comprising means defining at least one recess integral with or securable to one item to be hinged to another item and means defining at least one member complementary to the or each recess so that the inter-engagement of the or each recess and the or each member will provide the required hinge action, at least one of the defining means being integral with a plate-like portion thereof incorporating at least one resilient detent, the plate-like portion being arranged to engage in a slot of the corresponding said item and to be retained therein by engagement of the detent in a

corresponding recess or aperture in the wall of the slot.

Such assemblies embodying the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a fragmentary perspective view illustrating a part of a box and one component of one embodiment of the hinge assembly in accordance with the invention;

Figure 2 is a fragmentary, exploded, perspective view illustrating another part of the box to be hinged to the box part illustrated in Figure 1 and another hinge component;

Figure 3 illustrates the hinge component of Figure 2 as assembled to the second box part and viewed from the opposite side of the latter;

Figure 4 shows a modification of the hinge component as illustrated in Figure 2;

Figure 5 illustrates a modification of the hinge component shown in Figure 1; and

Figure 6 is a fragmentary perspective view illustrating

a further modification of the hinge component illustrated in Figure 2.

Referring now to the drawings, Figure 1 illustrates in perspective an edge portion 10 of a moulded plastics box part in incorporating a projection 12 which defines two recesses 14 (only one shown) or alternatively a single through hole extending from one end of the projection to the other. The projection will be designed so that the pivot axis defined by the recess or through hole 14 will result in accurate mating of the two items to be hinged together when the items are in the closed condition.

Figure 2 illustrates a hinged pin-like member 16 which comprises two truncated pins 18 extending from bosses 20 of generally cylindrical form which are integral with a plate-like portion 22 which is deeply recessed at 24 to provide flexibility and also to define a resilient detent 26 which is bent out of the general plane of the plate-like portion. Figure 2 also illustrates as a fragmentary perspective, an edge portion 28 of the other item of the assembly to be hinged which is formed with a slot 30 having a through recess 32 as best seen in Figure 3 which is so located that when the second hinge component is fully engaged in the slot 30, the detent 26 engages in the through recess 32 and cannot readily

be detached because of the action of the detent.

A degree of flexibility of the second component enables the two pin-like members 16 engage to successively in the recesses or through aperture 14 of the first component and hence during the assembly operation the completion of the hinge assembly will take place before the second component is located and locked in the slot 30 of the second component of the box. The hinge pins will be so sized that relatively little distortion of the second component is necessary in order to effect hinging engagement but will nevertheless be of sufficient length to ensure that the hinge cannot become inadvertently disengaged. The detent 26 is made sufficiently resilient to ensure that a push action into the slot will immediately result in a detectable click so that the assembly operator will know that the hinge component is properly engaged without the need for visual inspection.

In the modification of Figure 4 the component of Figure 2 has been modified to have two detents 26 one at each end but otherwise the construction is similar and the manner of use is identical except, of course, that the recess in the wall of the slot 30 is replaced by two separate recesses, or possibly a single more elongate

recess.

Figure 5 illustrates that the integral construction of the first component of the hinge as illustrated in Figure 1 can be replaced by a separate component 40 which is made on the same principle as the component of Figure 2, that is the recess defining cylindrical portion 12 is integral with a plate-like portion 42 having a detent 44 engageable in a recess provided in a slot wall formed in the first box part 10 in the same manner as the slot 30 of Fig. 2.

Finally, the modification illustrated as a fragmentary perspective exploded view in Figure 6 provides an alternative way in which the plate-like portion 50 of the hinge component can have its detent 52 engaged in material defined by an auxiliary slot 54 extending transversely to the main slot 56 which receives the plate-like portion. All the embodiments have the advantage that when it is desired to replace the hinge component, for example when the latter is damaged or broken, it is a simple matter of using a small screw driver to deflect the detent 26, 44 or 52 thus enabling the broken component to be removed. As will be apparent from Figure 6, the main difference in relation to Figure 2 is that the detent extends into a closed

aperture rather than a recess and hence there will be a reduction in flexibility.

The material of the hinge components hereinbefore described may be nylon, acetal resin or polycarbonate and need not be the same material as the basic material of the components to be hinged together. The components defining the pins may be plain cylindrical, conical, hemispherical or other appropriate shape which is a body of revolution. It is, of course, important that the plastics material, particularly of the pin component shall be sufficiently flexible to enable ready dis-assembly and the pins themselves must have sufficient length to ensure that they cannot readily become detached from the component defining the recess or recesses.

Since it is normal practice for any hinged components to employ two hinges the risk that the hinges will become separated when in use is reduced by making the pins which are adjacent to one another considering the length direction of the hinge line longer than the pins or like components which are spaced further apart, considered along the hinge line. Once the whole box or other item is assembled together the two components of greater length will assist one another in preventing

dis-engagement from the corresponding recess of the respective hinge assembly. Indeed, wherever two hinges are to be used, it becomes necessary to provide only a single pin-like member on each hinge, thus simplifying assembly and avoiding the need to have the corresponding hinge component made flexible. The pin-like members can be adjacent or remote from one another since irrespective of which arrangement is selected, relative motion of either hinge pin is prevented by the other hinge pin.

While the invention is primarily applicable to plastics boxes where strong hinges are not particularly necessary, the availability of high strength moulded plastics materials means that hinge assemblies in accordance with the invention can also be applied to heavier duties.

CLAIMS

1. A plastics hinge assembly comprising means defining at least one recess integral with or securable to one item to be hinged to another item and means defining at least one member complementary to the or each recess so that the inter-engagement of the or each recess and the or each member will provide the required hinge action, at least one of the defining means being integral with a plate-like portion thereof incorporating at least one resilient detent, the plate-like portion being arranged to engage in a slot of the corresponding said item and to be retained therein by engagement of the detent in a corresponding recess or aperture in the wall of the slot.

2. A member for forming a hinge together with integrally moulded portions of two items to be hinged to one another, said member comprising a plate having a resilient detent bent out of the plane of the plate to engage with a recess or aperture in one of the items to be hinged, the plate carrying two pins extending towards one another in the plane of the plate.

3. A member for forming a hinge together with integrally moulded portions of two items to be hinged to one another, said member comprising a plate having a

resilient detent bent out of the plane of the plate to engage with a recess or aperture in one of the items to be hinged, the plate carrying means defining a cylindrical portion, each end of which is adapted to receive a pin formed on the other item to be hinged.

4. A plastics assembly comprising two members hingedly connected together along adjacent edges, the edge of one member defining a slot for receiving a member according to claim 2, a wall of the slot defining a recess or aperture for engaging with said detent and the edge of the other member defining a cylindrical portion, the pins being received in opposite ends of said cylindrical portion.

5. A plastics assembly comprising two members hingedly connected together along adjacent edges, the edge of one member defining a slot for receiving a member according to claim 3, a wall and the edge of the other member defining two inwardly facing pins adapted to engage in opposite ends of the cylindrical portion.

6. A hinge member substantially as herein described with reference to the accompanying drawings.

7. A plastics assembly substantially as herein described with reference to the accompanying drawings.